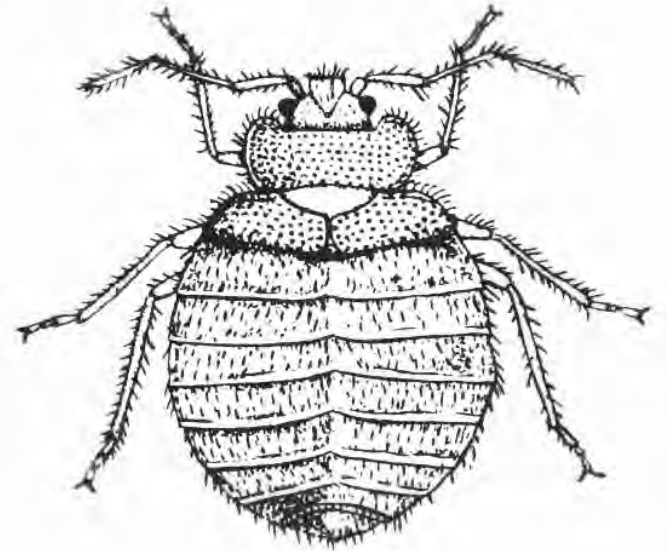


Bed Bug Basics

Laura Jesse

Plant & Insect Diagnostic Clinic
Iowa State University



Challenge of bed bugs

- **Bed bugs are here to stay**
- **Bed bugs are expensive**
- **Bed bugs cannot be ignored**
- **Bed bugs are a big headache to anyone owning or managing rental properties, hotels, etc**

Recent History

- **Familiar to people of the early 1900s**
 - Up to one-third of residences in some cities
 - Rated in the “top three pests”
- **Steady decrease in mid-20th century**
 - DDT (?)
 - Sanitation
 - Standard of living
- **Re-appearance in mid 1990s**



Recent Rise



- **Change in pest control tactics**
 - Emergence of baits for ants, roaches
 - Improved pest control for targeted pests
 - Bed bugs feed only on blood
 - Unaffected by baits
- **Insecticide resistance**
- **Lack of recognition of infestation**
- **Thrift shops, flea markets, garage sales**

What are Bed Bugs?



Bed Bugs

- **Blood-feeding ectoparasite**
- **Completely dependent on humans**
 - **Prefer to feed only on people**
 - **Well adapted to homes**
 - **Travel well with people**
 - **Almost always introduced by our activities (introduced through personal items: luggage, purses, briefcases, etc.)**

Bed Bug Description

- Up to 3/16 inch long
- Flattened, oval body
- Reddish brown in color
- Nymphs look like adults, but translucent



Photo from CDC

Bed Bug Life Cycle

- Simple life cycle
- 5 nymphal stages
 - Nymph must have a blood meal before molting
- Nymphs are colorless at first



Bed Bug Habits

- Hide during the day
- Dark, protected cracks and crevices
- Prefer fabric, wood & paper surfaces
- Usually close to the host





**Bed bugs “hiding”
at ceiling / wall
junction**



Blood Feeding

- Blood smears in hiding spots
- Blood smears on sheets and cases



Bed Bug Bites

- Usually on exposed skin – face, neck, extremities
- Impossible to diagnose insect from the bites
- Allergic reactions are to the saliva and vary by individual



Bed Bug Bites

- No disease transmission
- Medical significance: itching, discomfort, inflammation, sleeplessness, anxiety, embarrassment



Proper Identification

Bed Bug vs. Bat Bug

- **Very similar in appearance**
 - **Need a microscope**
- **Bat bugs feed on bats**
 - **Bat bugs can also bite humans**
- **A problem in homes with bats or birds**

Bed Bug

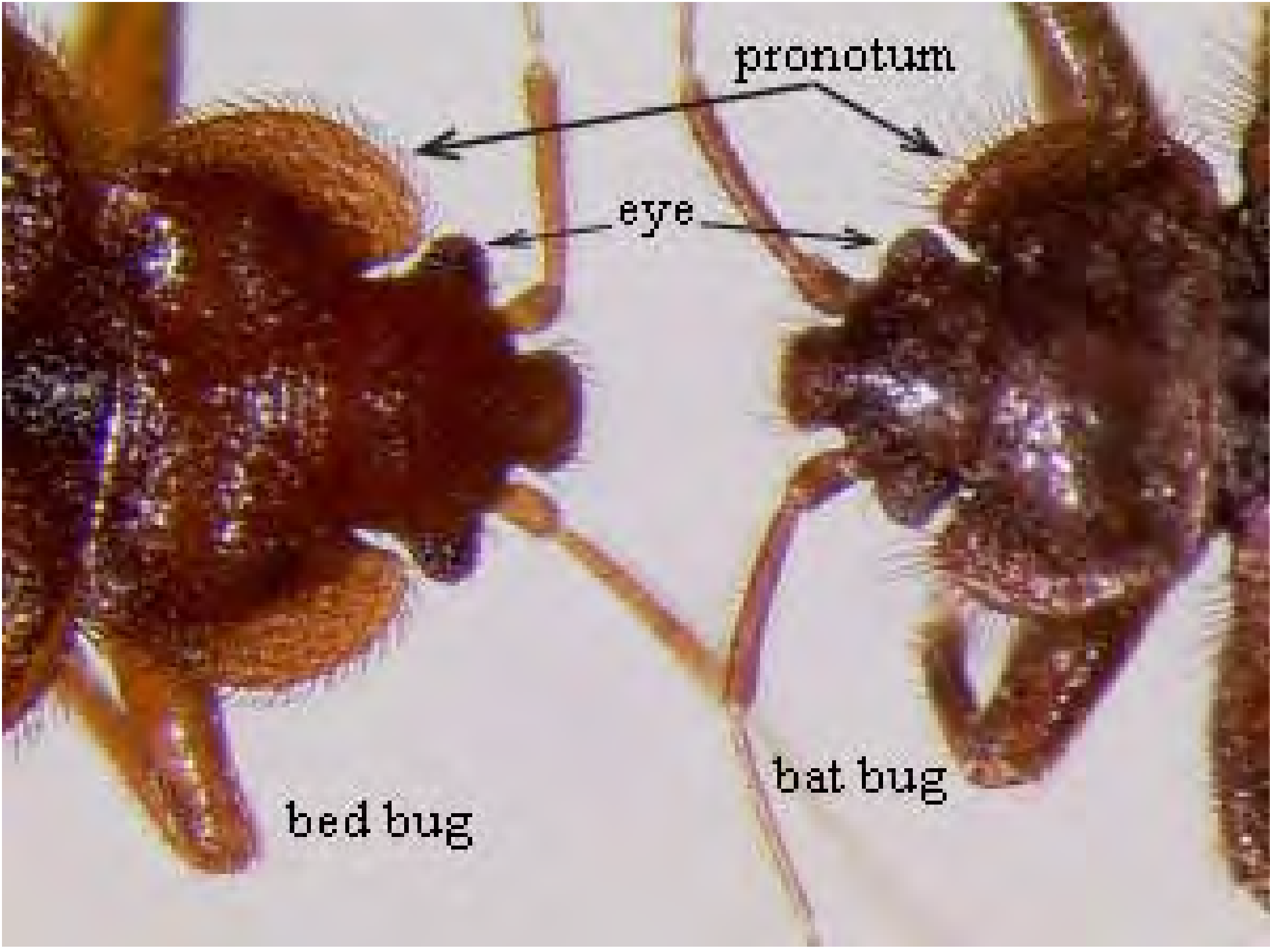


**Short stiff hairs on
thorax**

Bat Bug



**Long, soft hairs on
thorax**



pronotum

eye

bed bug

bat bug

Bat Bugs

- **Often found throughout home, not just near beds**
- **Usually not in large numbers**
- **Homes will have bats roosting in the attic**
- **Often get reports of bat bugs in fall when bats migrate away**
- **Hungry bugs wander into home**

Detecting Bed Bugs

- Visual
- Monitors
- Climb-up Interceptors
- Sticky traps
- Scent detection canines



Jeff Hahn, Univ MN

Delusory Parasitosis

- **Unexplained biting or crawling sensation**
- **Itching or irritation of unknown origin**
- **Fixation: insect or mite problem**
- **No arthropods present**

Biting Pests

Obvious

- **Mosquitoes**
- **Ticks**
- **Lice**
- **Fleas**
- **Bat bug and Bed bug**
- **Masked hunter**

Cryptic

- **Bird mites**
- **Rodent mites**
- **Scabies**
- **Chiggers**

Send me a Sample

- **Lint balls**
- **Thread balls**
- **Dried blood**
- **Dead skin**
- **Dried serum**
- **Soil particles / Sand**
- **“other debris excoiated from the skin”**



You have Bed Bugs!

- **Do NOT discard furniture**
 - May not be necessary
 - Greatly adds to cost
 - Spreads the bed bugs
- **If possible do not sleep elsewhere in house**



You have Bed Bugs!

- **Bed bugs are a challenge to eradicate**
 - **Professionals needed**
 - **Repeated treatment will be needed**
 - **A good relationship with your pest control professional is important**
- **They do not transmit diseases**
 - **However, bed bug infestations can be psychologically difficult**
 - **Costly and a public relations concern for hotels, dorms, hospitals, etc.**

Control Techniques

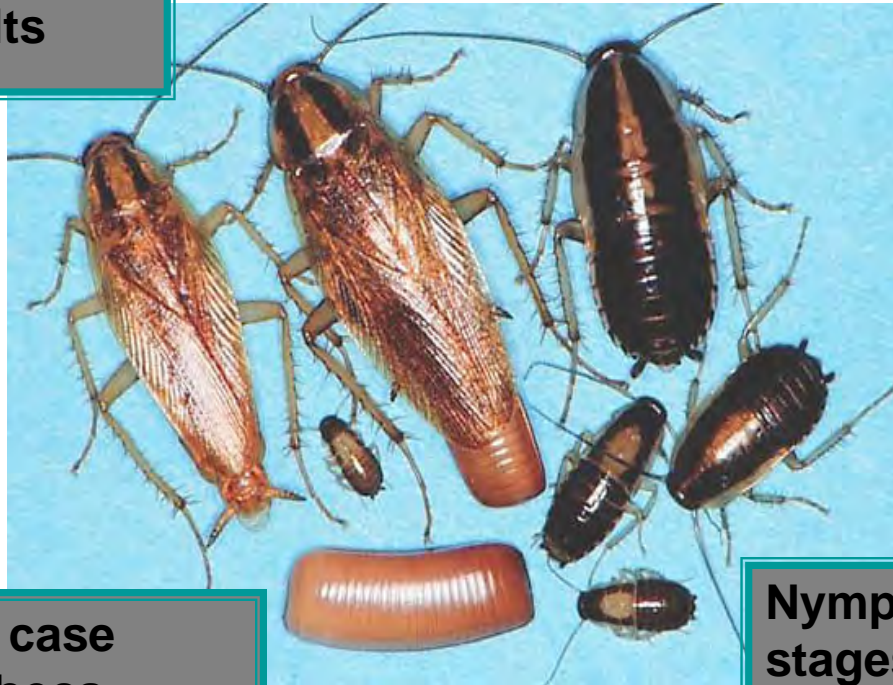
- Chemical
- Steam
- Encasement
- Thermal remediation
- Freezing treatments



**Questions on Bed bugs
before we move on??**

Cockroaches

Adults



**Egg case
Ootheca**

**Nymphal
stages**

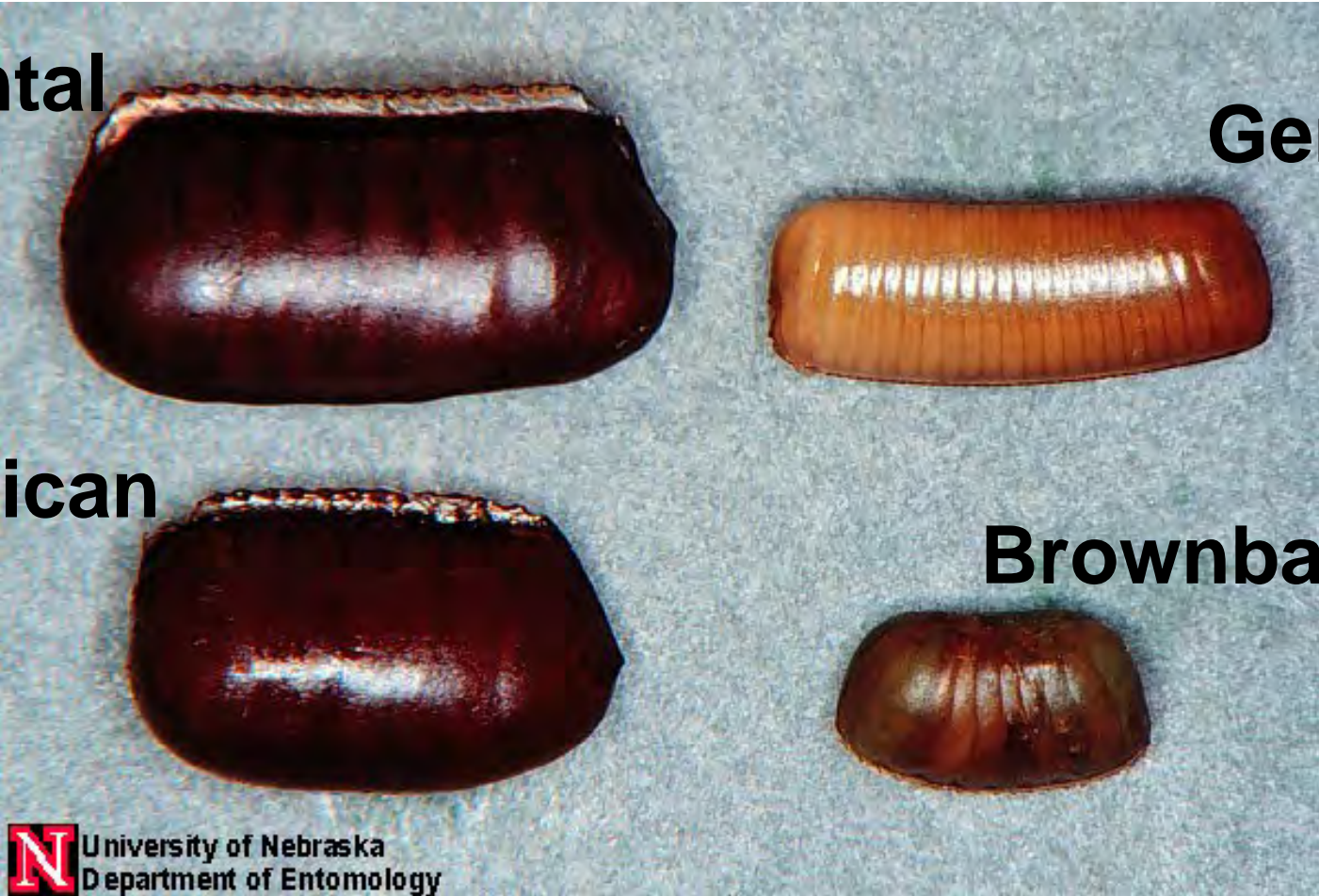
Cockroach Egg Cases

Oriental

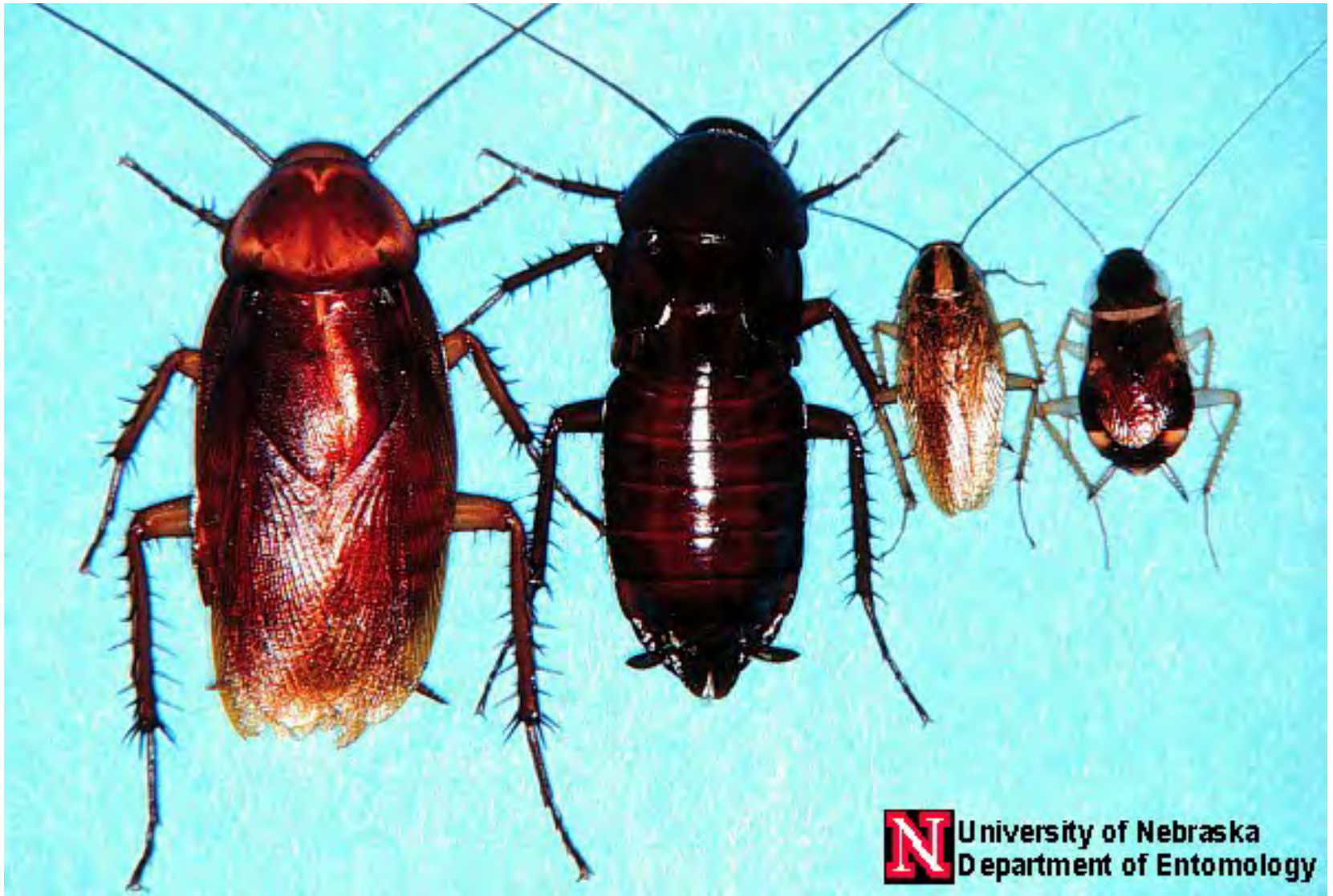
German

American

Brownbanded



Common Cockroach Species





American cockroach

- **Basements, sewers**
- **Warm & moist places**
 - **furnaces**
 - **steam pipe tunnels**
 - **grease traps**



German cockroach

- **Most common**
- **Kitchens, restrooms**
- **Prefers warm, moist, dark voids (3/16" wide)**

Oriental cockroach

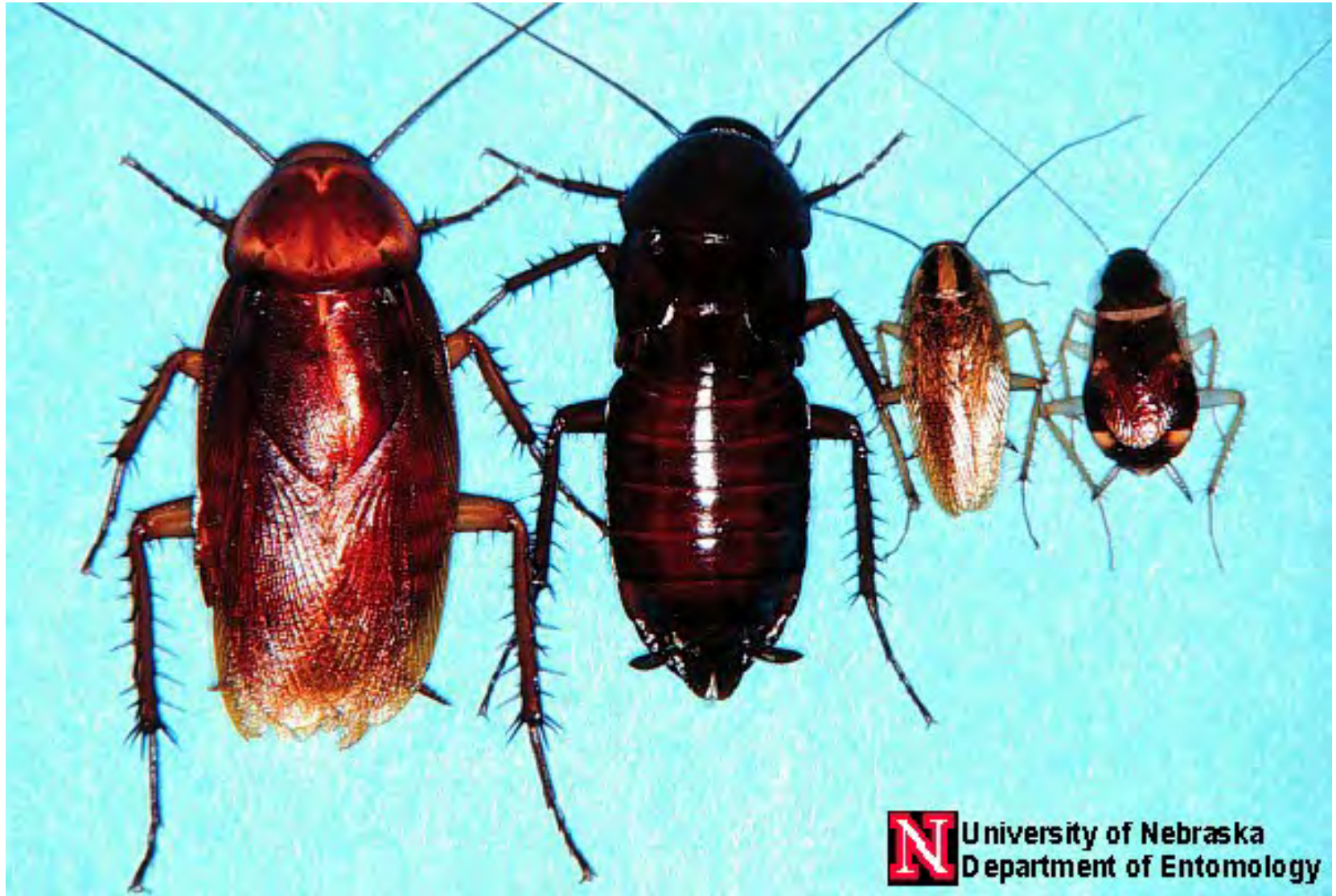


- **Moist areas**
- **Cooler areas of a building
(basements, service ducts,
crawl spaces)**



Brownbanded cockroach

Warm, dry areas
High locations



American Oriental German Brown-banded

Cockroach IPM

- **Reduce access to**
 - Food
 - Water
 - Shelter
- **Baits**
- **Sprays**



**Cockroach questions
before we move to ants?**

Guide To Common Ants in Iowa

(Wingless workers only)

Prepared by Donald R. Lewis and Laura Jesse, Department of Entomology
Iowa State University



Pharaoh Ant, *Monomorium pharaonis*
1/16 inch; 2 nodes, light yellowish red
12 antenna segments, w/ 3 segment club



Larger Yellow Ant
Acanthomyops interjectus
1/4 inch; 1 node, Yellow-orange
Very small eyes



Thief Ant, *Solenopsis molesta*
1/16 inch; 2 nodes
Light brown to yellow
10 antenna segments, w/ 2 segment club



Field Ant, *Formica* spp.
3/8 inch; 1 node
Brown to black
Thorax silhouette uneven in side view



Odorous House Ant, *Tapinoma sessile*
1/8 inch; 1 node that is not easily seen
Dark brown to black
Abdomen slopes forward over node



"Smaller" Carpenter Ant
Camponotus nearcticus
1/4 - 1/2 inch; 1 node; Brown; red thorax
Evenly rounded thorax



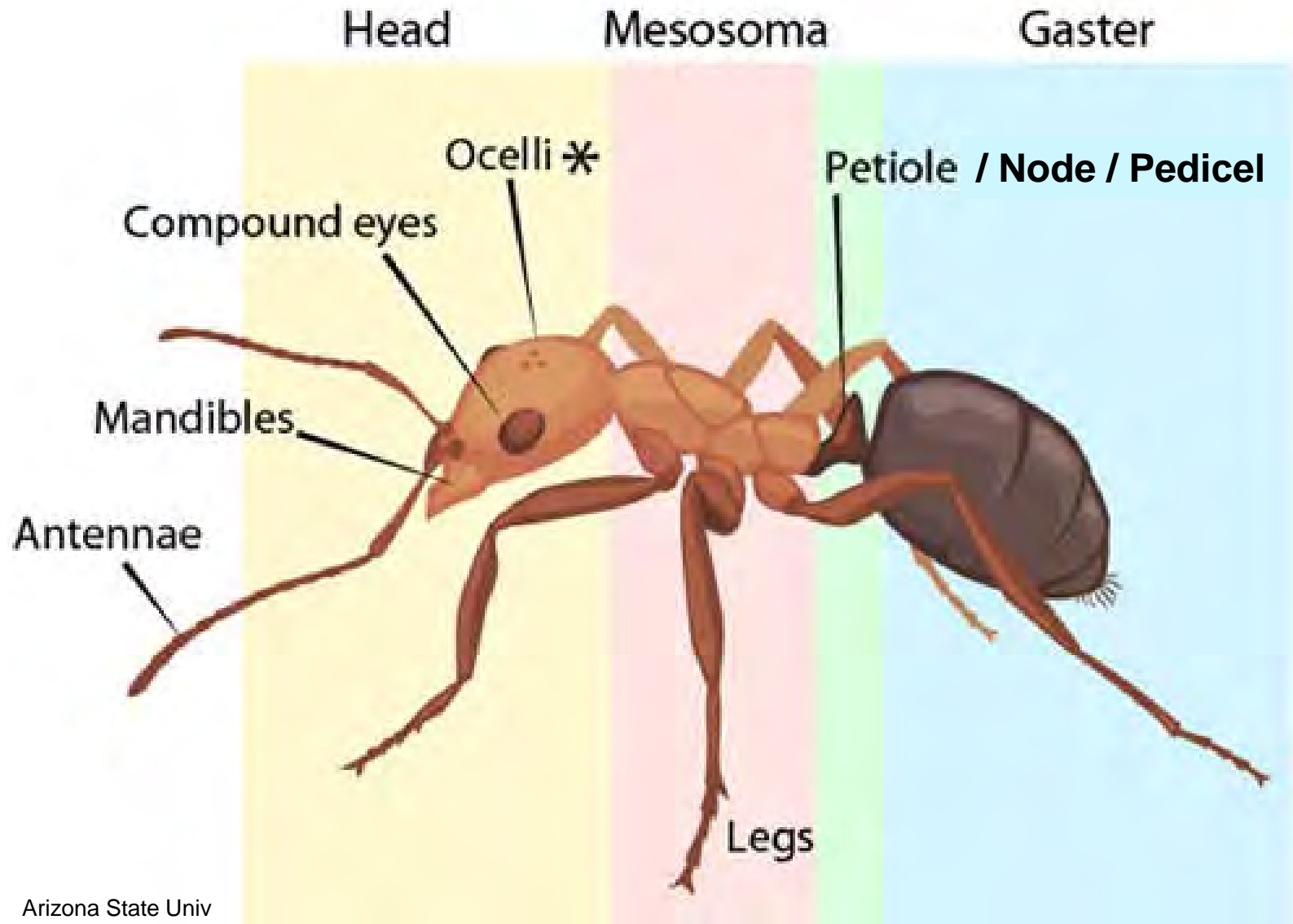
Pavement Ant, *Tetramorium caespitum*
1/16 to 1/8 inch; 2 nodes
Yellowish red; One pair of spines on thorax
Sculptured lines on head



Carpenter Ant, *Camponotus pennsylvanicus*
1/2 to 3/4 inch; 1 node
Black
Evenly rounded thorax

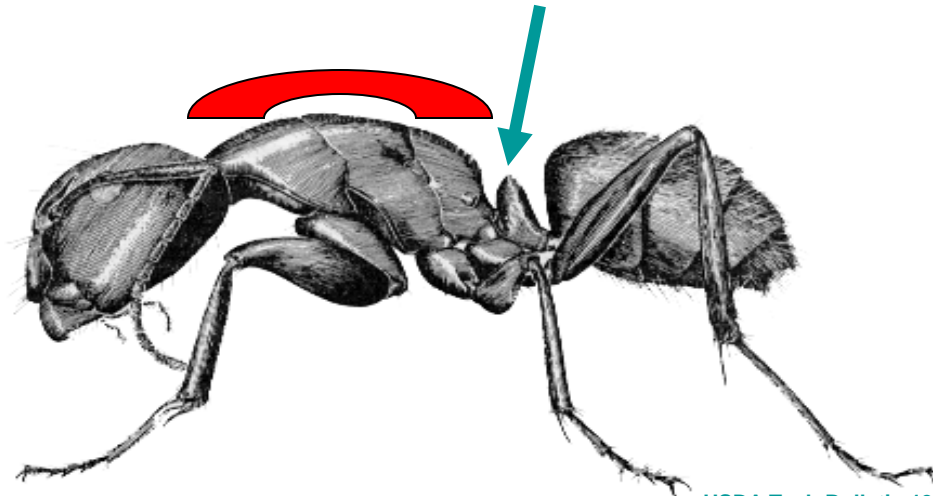
Guide to Common Ants in Iowa

Ant Anatomy



Carpenter Ant

- 1/4 to 1/2 inch
- 1 node
- black or 2-toned
- evenly rounded thorax



A photograph of an ant colony on a light-colored wooden surface. Numerous black ants are visible, some of which are larger than others. A large cluster of light-colored, oval-shaped pupae is in the center. Three teal callout boxes with black text identify specific features: 'Pupae' points to the central cluster, 'Major worker' points to a large ant on the left, and 'Minor worker' points to a smaller ant at the bottom. The background is a wooden surface with some plastic sheeting visible on the left and bottom.

Pupae

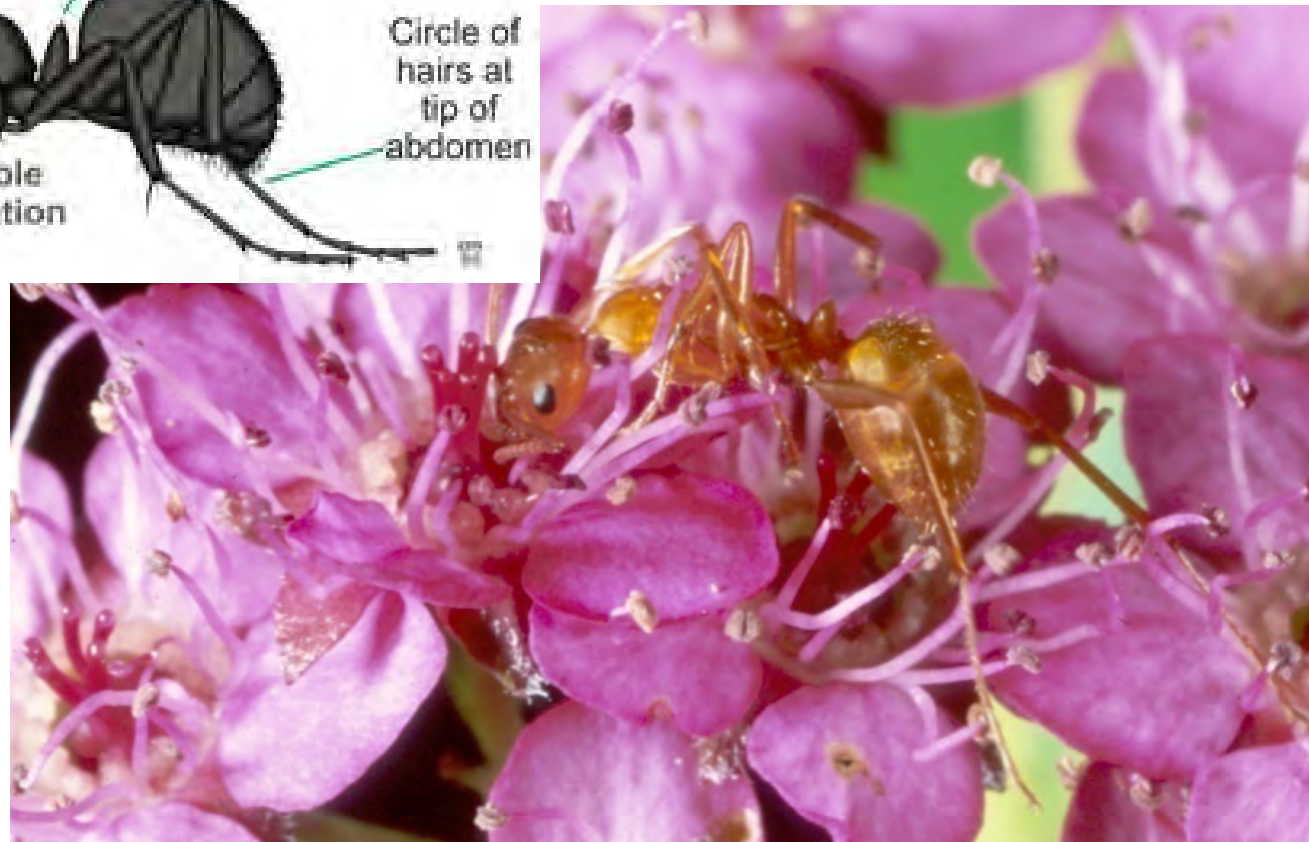
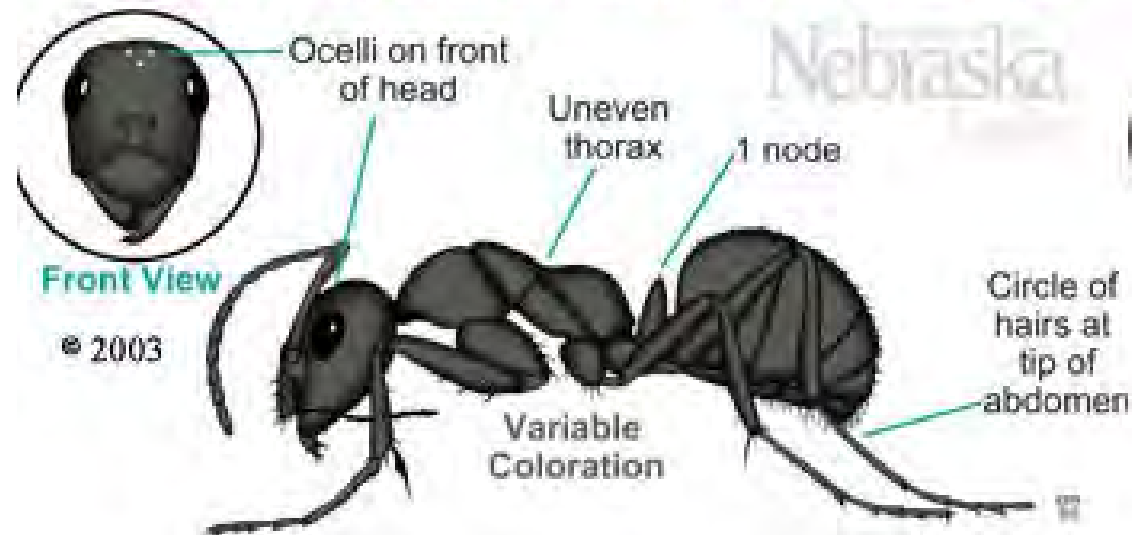
**Major
worker**

**Minor
worker**



Field Ants

Field ants may be black, brown, tan, reddish, or red and black in color. Often confused with carpenter ants.

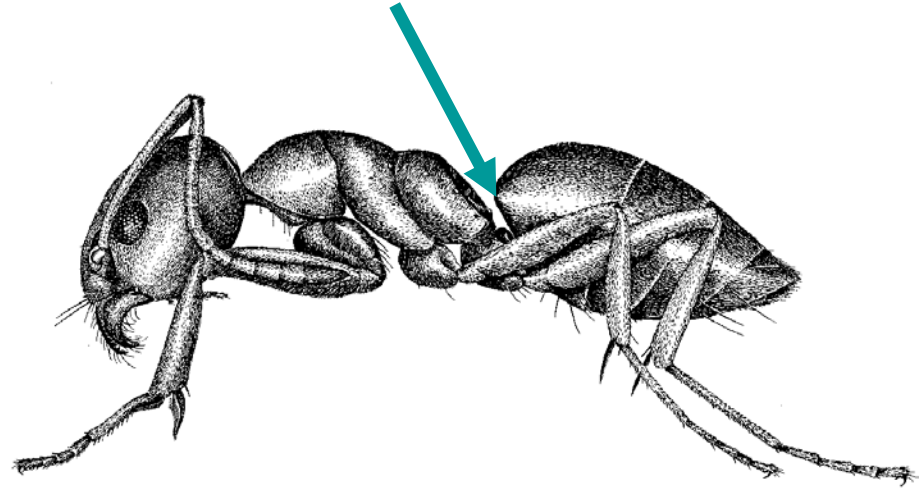


Carpenter ants

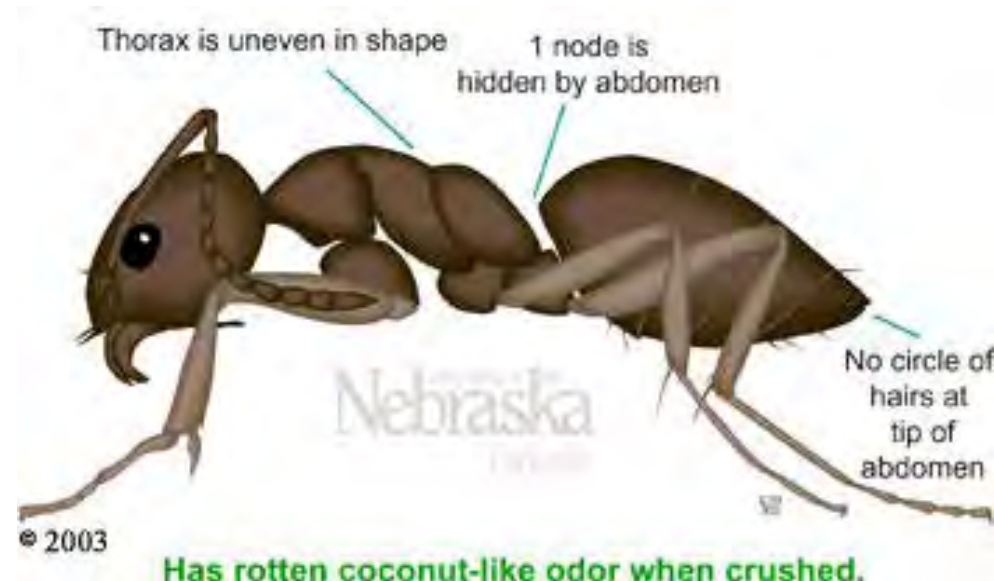
- **Do not eat wood!**
- **Not a serious household pest**
- **Strong walkers, forage long distances**
- **Colonies can be indoors or outdoors**
- **Difficult to control**
 - **Baits do not work well**

Odorous House Ant

1/16-1/8 inch
dark brown
one node / hidden
no circle of hairs
rotten coconut odor
when crushed



Odorous House Ant



- Scavengers
- Dead and live insects
- Sweets
- Honeydew from aphids, mealybugs
- Numerous queens



Odorous House Ant

- **Nests - outdoors**
 - Under mulch, soil, stones, debris
- **Nests – indoors**
 - Wall voids, potted plants, appliances
- **Nests can be moved**
- **Trail-making indoors and out**



Odorous House Ant

- Difficult to control
- Remove ready access to food and moisture
- Caulk entry points
- Not readily controlled with bait, alone
- Takes more than a residual insecticide barrier



Odorous House Ant

- Do not disturb foraging trails
- Apply non-repellent residual liquid
- Spot treat with a variety of ant bait formulations, both outdoors and indoors.
- Match bait choice to forager acceptance
- Bait preference may change over time; re-inspect weekly or bi-weekly
- Track workers to determine nest locations



Odorous house ants

- If ants don't respond immediately to a fresh bait deposit, switch to an alternative bait formulation. Try a combination of products.



Larger Yellow Ant

1/4 inch

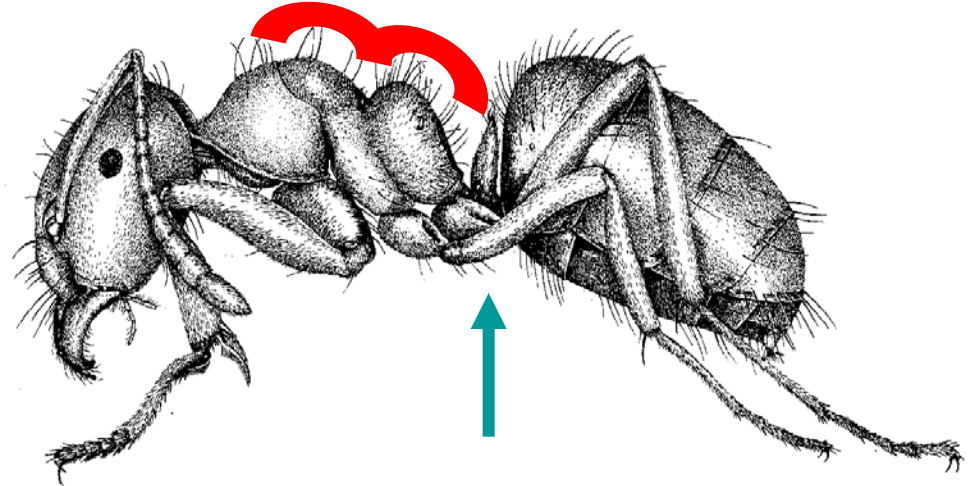
yellow-orange

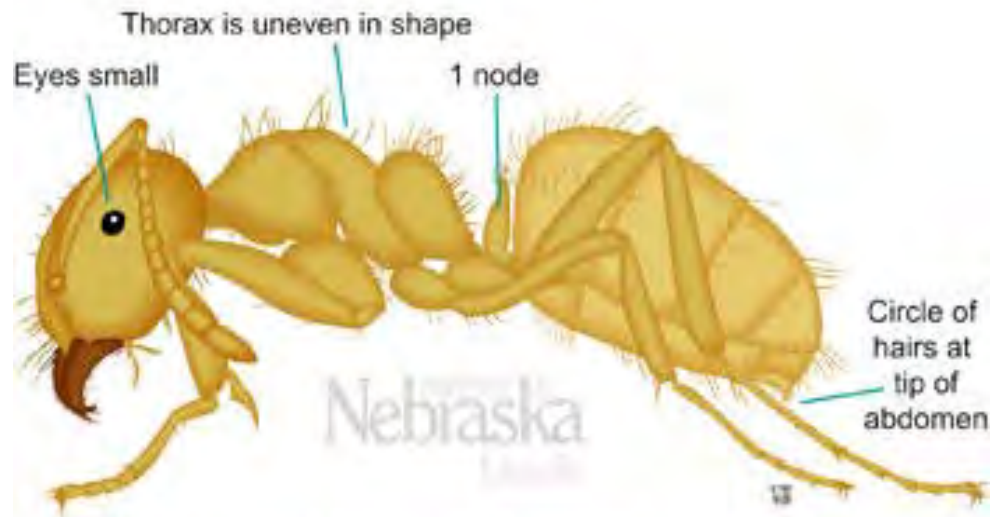
1 node

small eyes

**citronella odor when
crushed**

**Wander indoors in
the fall, not a pest**





© 2003

Also called Citronella Ant or Foundation Ant.
Gives off "citronella" odor when crushed.



Larger Yellow Ant



Grease Ant (Thief Ant)

1/16 inch

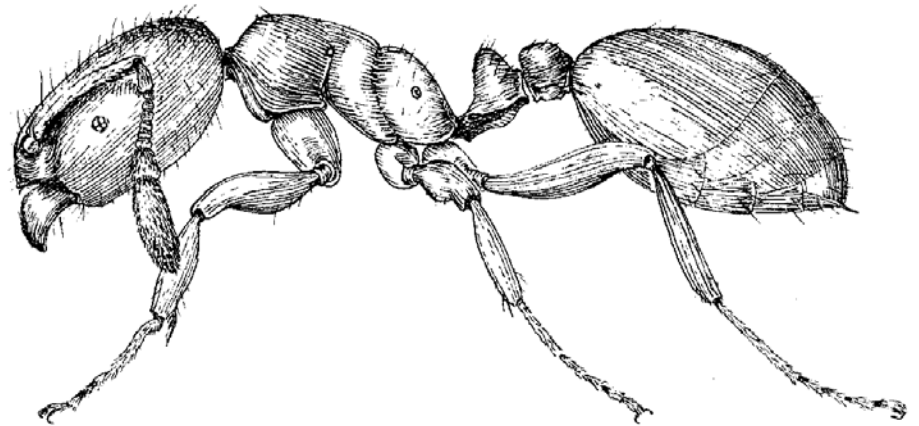
yellowish-brown

2 nodes

Antennae =

10 segments

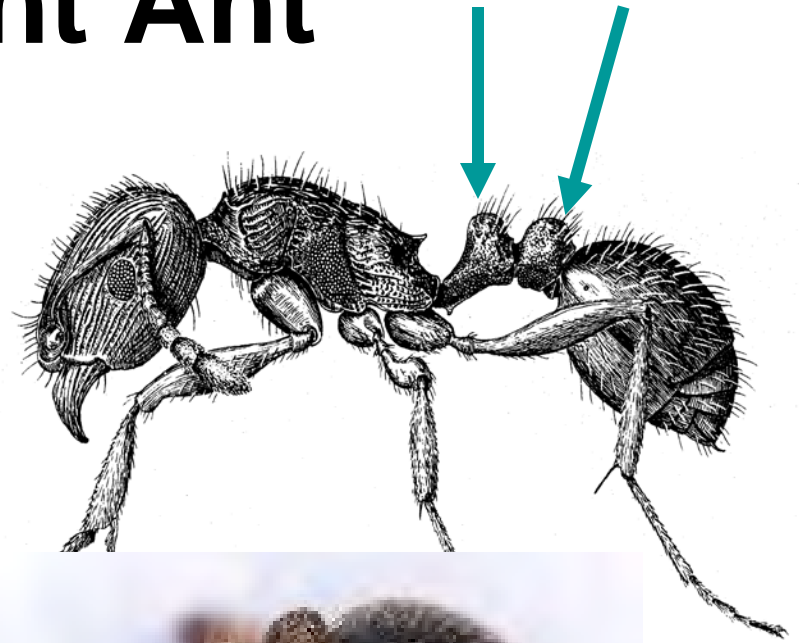
Club = 2 segments



L. Jesse
Iowa State University

Pavement Ant

1/8 inch
dark brown
2 nodes
spines on thorax
grooves on head



L. Arar
Iowa State University
Insect Diagnostic Clinic

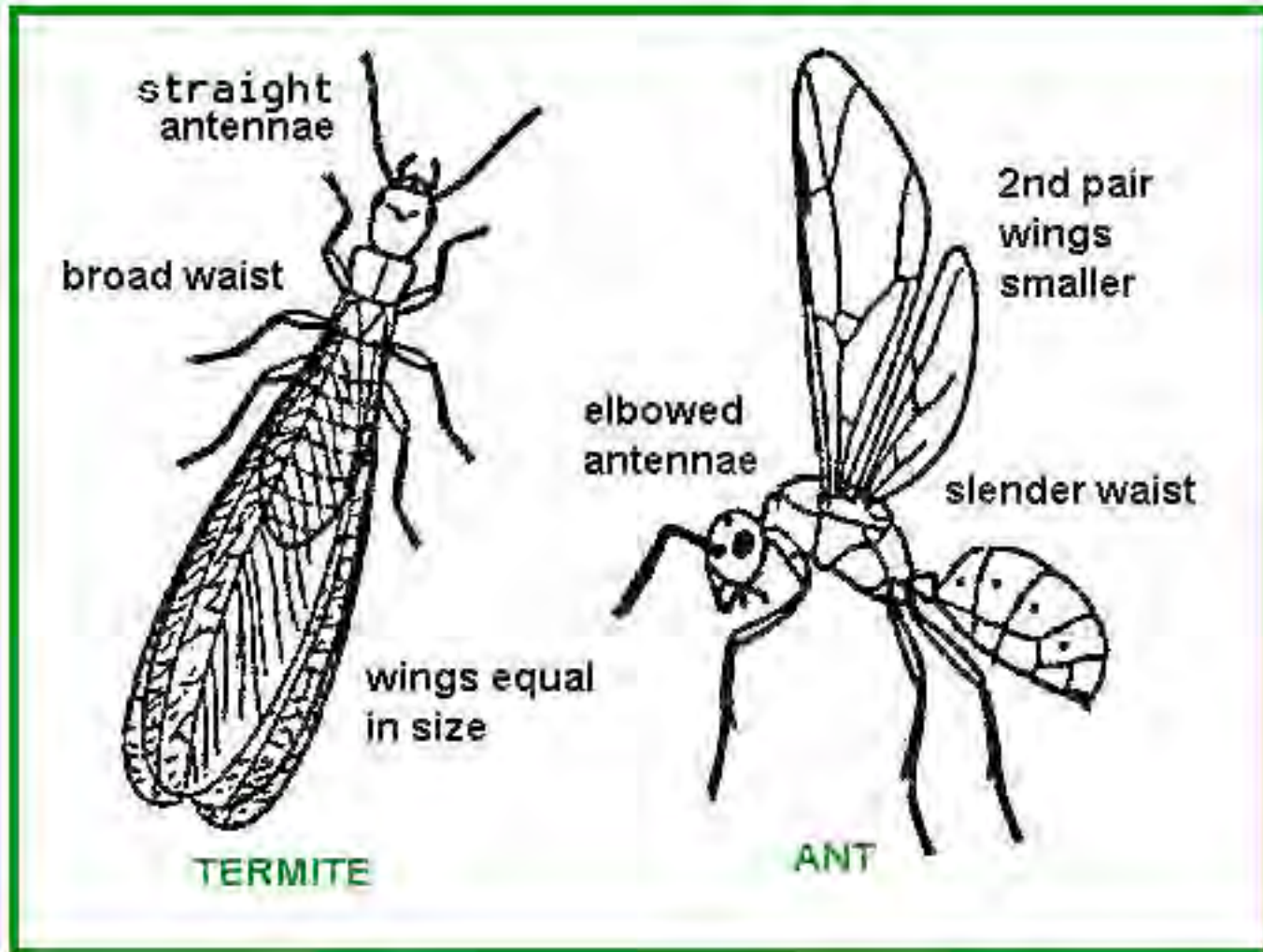
Swarmers



Winged termites



Ant vs Termite



Pest ID Resources

- Polk Co Health Dept Bed Bug:
<http://cms.polkcountyiowa.gov/health/Pages/Bedbug.aspx>
- ISU Plant & Insect Diagnostic Clinic
 - Samples
- Digital images to insects@iastate.edu
- BugGuide.org
- Google – site:edu or site:gov
 - Ex: household ants site:edu

<http://clinic.ipm.iastate.edu>

IOWA STATE UNIVERSITY
College of Agriculture and Life Sciences



Plant and Insect Diagnostic Clinic

IOWA STATE UNIVERSITY
Extension and Outreach

Welcome to the Plant and Insect Diagnostic Clinic!

We have information pages on:

Insects **Plants** **Plant Diseases**

We also have pest related **articles**.

Submit a sample
for diagnosis or identification



The Plant and Insect Diagnostic Clinic provides diagnosis of plant problems (plant diseases, insect damage, and assessment of herbicide damage) and the identification of insects and weeds from the field, garden, and home. The PIDC is a joint effort between Iowa State University Extension Plant Pathology, Entomology, Horticulture, and Agronomy.

Iowa State University
327 Bessey Hall
Ames, IA 50010
Phone: 5152940581
Email: via **webform** or at pidc@iastate.edu

Terms and Conditions
View Driving Directions

Sample Submission

Table of Contents

- 1. [Fees](#)
- 2. [Forms \(Link to PDF download\)](#)
- 3. [Submit Plant for Diagnosis](#)
- 4. [Submit Insect for Identification](#)

The ISU Plant and Insect Diagnostic Clinic staff can diagnose plant health problems caused by diseases, insects or the environment. In addition, they also can identify insects, weeds and fungi. Once they have diagnosed your disease or identified your insect pest, they can advise you on the best course of action to take.

Fees

Plant problem diagnosis (disease, insect, herbicide, abiotic)	\$20.00
Plant & mushroom ID	\$10.00
Insect ID	\$10.00

Forms (Link to PDF download)

- [Plant Problem Diagnosis](#)
- [Household Pest Identification](#)

Thank you! Questions?

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